

## WHAT IS CLAIMED IS:

1. An apparatus for plasma implantation, comprising:

a vacuum container defining a vacuum chamber therein;

a table provided in the chamber for supporting a  
5 substrate to which an impurity is implanted;

a plasma generating element provided outside the  
chamber;

a first power source for applying a first high  
frequency electric power to the element to form a plasma in  
10 the chamber;

a second power source for applying a second high  
frequency electric power to the table;

a first detector for detecting a condition of the  
plasma;

15 a second detector for detecting a voltage or a current  
in the table; and

a controller for controlling at least one of the first  
and second high frequency electric power according to the  
condition of the plasma detected by the first detector  
and/or the voltage or the current detected by the second  
20 detector, thereby controlling an implantation concentration  
of the impurity to be implanted.

2. The apparatus of claim 1, wherein the first detector  
25 detects the condition using a method selected from an

optical emission spectroscopy, a single probe method, a double probe method, a triple probe method, a laser induced fluorescence method, an infrared laser absorption spectroscopy, a vacuum ultra violet absorption spectroscopy, a laser scattering method and a quadrupole mass spectroscopy.

3. An apparatus for plasma implantation, comprising:

a vacuum container defining a vacuum chamber therein;

a table provided in the chamber for supporting a substrate to which an impurity is implanted;

a plasma generating element provided outside the chamber;

a first power source for applying a first high frequency electric power to the element to form a plasma in the chamber;

a second power source for applying a second high frequency electric power to the table;

an electrode provided adjacent the table and connected through a capacitor to the table;

a first detector for detecting a condition of the plasma;

a second detector for detecting a voltage or a current in the electrode; and

a controller for controlling at least one of the first

and second high frequency electric power according to the condition of the plasma detected by the first detector and/or the voltage or the current detected by the second detector, thereby controlling an implantation concentration of the impurity to be implanted.

4. The apparatus of claim 3, wherein the first detector detects the condition using a method selected from an optical emission spectroscopy, a single probe method, a double probe method, a triple probe method, a laser induced fluorescence method, an infrared laser absorption spectroscopy, a vacuum ultra violet absorption spectroscopy, a laser scattering method and a quadrupole mass spectroscopy.

5. A method for impurity implantation into a substrate, comprising:

positioning a substrate on a table provided within a chamber;

generating a vacuum in the chamber;

supplying an impurity into the chamber;

applying a first high frequency electric power to a plasma generating element to thereby cause a plasma so that the impurity in the chamber is implanted in the substrate;

applying a second high frequency electric power to the

table;

detecting a condition of the plasma in the chamber;

detecting a voltage or current in the table; and

controlling at least one of the first and second high  
5 frequency electric power according to the detected  
condition of the plasma and/or the detected voltage or  
current, thereby controlling an implantation concentration  
of the impurity to be implanted in the substrate.

10 6. The method of claim 5, wherein a frequency of the  
power from each of the first and second power sources is  
controlled in a range from 300kHz to 3GHz.

7. A device, having a member made from a substrate to  
15 which an impurity is implanted by the method of claim 5.

8. A method for impurity implantation into a substrate,  
comprising the steps of:

positioning a substrate on a table provided within a  
20 chamber;

generating a vacuum in the chamber;

supplying an implantation impurity into the chamber;

applying a first high frequency electric power to an  
element to thereby cause a plasma so that the impurity in  
25 the chamber is implanted in the substrate;

applying a second high frequency electric power to the  
table;

detecting a condition of the plasma in the chamber;

detecting a voltage or current in an electrode  
5 connected through a capacitor to the table; and

controlling at least one of the first and second high  
frequency electric power according to the detected  
condition of the plasma and/or the detected voltage or  
current, thereby controlling an implantation concentration  
10 of the impurity to be implanted.

9. The method of claim 8, wherein a frequency of the  
power from each of the first and second power sources is  
controlled in a range from 300kHz to 3GHz.

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10. A device, having an element made from a substrate to  
which an impurity is implanted by the method of claim 8.